Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Evanescent Wave Excitation and Raman Spectroscopy of Bacteriorhodopsin on Gallium Nitride Waveguide Structures ALFONS SCHULTE, SONYA ORTIZ, ALFRED KELLER, APRIL POPE, YU GUO, HEIDI HOCKEL, ERIC JOHNSON, University of Central Florida — Composite structures of protein-semiconductor layers have potential for molecular electronics and sensor applications. We investigate gallium nitride waveguide structures created by UV lithographic techniques as substrates for photoactive bacteriorhodopsin films. The waveguides were characterized through electron and optical interference microscopy. The top biomolecular layer is optically accessible through the evanescent field of a mode propagating in the gallium nitride waveguide. A 488 nm or 514 nm beam from an Argon ion laser was coupled into the waveguide and the evanescent field was employed to initiate the photocycle and excite Raman scattering in the bacteriorhodopsin film. Under stationary conditions the Raman spectrum in the fingerprint region shows the presence of the light-adapted state and the M intermediate. This suggests that the protein is in its native state and that optical switching of bacteriorhodopsin can be achieved and probed by evanescent wave excitation.

Alfons Schulte
University of Central Florida

Date submitted: 04 Dec 2005 Electronic form version 1.4